

ARISTOTLE G. KALIVRETENOS
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CAREER SUMMARY:

- Expertise in solution/solid-phase synthetic organic chemistry; methodology and total synthesis
- Supervisory and Project Management experience
- Product Development and Commercialization Experience (G-Mark products)
- Track record of innovative accomplishment
 - Patents (5 issued, 2 pending)
 - Publications (16 in print; peer reviewed articles and book chapters)
 - Presentations (14 invited, 17 contributed)
- Experience with FDA and OSHA compliance requirements

EDUCATION:

- Ph.D.** Colorado State University; Organic Chemistry 1990
- **Dissertation:** "Synthesis of Macrolides via Organopalladium Chemistry. Application to the Synthesis of Zearalenone"
 - **Research Advisors:** Prof. John K. Stille and Prof. Louis S. Hegedus
- B.S.** Clemson University, Chemistry, *summa cum laude*. 1985

PROFESSIONAL EXPERIENCE:

COLLEGE OF NOTRE DAME OF MARYLAND, BALTIMORE, MD 2005 - present
Adjunct Professor of Chemistry

- **Teaching efforts:** Organic Chemistry and Laboratory in the Accelerated College for the B.S. Nursing Program

AURORA ANALYTICS, LLC 2004 - present
Chief Operating Officer, Co-Founder

- Launched G-Mark glucuronide and sulfate diagnostic standard product line
- Development of food quality indicator products
- Contract Chemical Synthesis and Analytical services

SENSORS FOR MEDICINE AND SCIENCE, INC., GERMANTOWN, MD 1998 – 2004
Scientist 1998 - 1999

- Design, synthesis and characterization of novel fluorescent chemosensors for glucose recognition

Scientist II 1999 - 2004

- Design, synthesis and characterization of novel fluorescent chemosensors for glucose recognition
- Directed organic chemistry and sensor validation work
- Conducted literature and patent searches
- Developed protocols for FDA compliance requirements

Safety Officer 2001 - 2004

- Maintained chemical inventory
- Developed protocols for OSHA compliance requirements

PARAGON BIOTECH, INC., BALTIMORE, MD

1998

Consultant

- Design of antiangiogenic target molecules

UNIV OF MARYLAND BALTIMORE COUNTY, BALTIMORE, MD

1992 - present

Assistant Professor of Chemistry

1992 - 1998

- **Research efforts:** bioorganic studies of channel forming peptides; solution and solid-phase protein/peptide/amine modification technology; preparation of heterocyclic compounds.
- **Teaching efforts:** Introductory Organic Chemistry; Organic Reaction Mechanisms; Organic Synthetic Methodology; Total Synthesis of Natural Products; Ion Channels of Excitable Membranes

Adjunct Assistant Professor of Chemistry

1998 - present

- **Teaching efforts:** General Chemistry

UNILEVER RESEARCH, U.S., EDGEWATER, NJ

1991 - 1992

Synthetic Consultant

- Developed strategies for the synthesis of radiolabeled compounds.

COLUMBIA UNIVERSITY, NEW YORK, NY

1990 - 1992

Post-doctoral Research Scientist (Research Advisor: Prof. Koji Nakanishi)

- Synthetic and bioorganic studies of Philanthotoxin (PhTX) in neuronal receptor systems.

TECHNICAL SKILLS:

- **Synthetic techniques:** solid-phase and solution-phase organic synthesis, automated and manual solid-phase peptide synthesis, organometallic synthesis, polymer synthesis/modification and radiosynthesis (^3H and ^{125}I)
- **Polymer techniques:** hydrophobic and hydrogel polymer synthesis and modification; molecular imprinted polymer design and synthesis
- **Purification techniques:** TLC, PTLC, LC, HPLC (including maintenance and repair), GPC, gel filtration and affinity chromatography
- **Spectroscopic techniques:** FT-IR, GC-MS, MALDI-TOF MS, 1D and 2D ^1H and ^{13}C NMR (maintained and repaired GE QE-300 NMR spectrometer), UV-VIS, CD, fluorescence
- **Lipid bilayer techniques:** painted, patch pipette and folded bilayer membrane techniques

HONORS RECEIVED:

- UMBC Research Travel Award (1997)
- Researcher for Sinai Hospital of Baltimore (1997-1998), American Heart Assoc., MD Affiliate
- NIH Post-doctoral Fellowship (1991)
- Synaptic Corporation Post-doctoral Fellowship (1991)
- Syntex Award for Excellence in Organic Chemistry, Colorado State University (1987)
- Colorado State Graduate Fellowship (1985)
- Michelin Undergraduate Grant for Study in France, Clemson University (1985)

PROFESSIONAL ACTIVITIES:

Membership

- American Chemical Society, Division of Organic Chemistry
- Phi Kappa Phi Honor Society

Reviewer

- Journal of Organic Chemistry
- Organic Letters
- Journal of Combinatorial Chemistry

Editor

- *Chemical Highlights*, Columbia University, 1991-1992

Activities at Conferences

- Session Chair, 17th International Symposium on the Separation of Proteins, Peptides and Polynucleotides, Rockville, MD, October 26-29, 1997.

PATENTS: (5 issued, 2 pending)

- "Butyryl-Tyrosinyl Spermine, Analogs thereof and Methods of Preparing and Using Same" Koji Nakanishi, Danwen Huang, Soek-Ki Choi, Aristotle Kalivretenos and Robert Goodnow, US Patent # 6,001,824, December 14, 1999.
- "Detection of Analytes by Fluorescent Lanthanide Metal Chelate Complexes Containing Substituted Ligands" Arthur E. Colvin, George Y. Daniloff, Aristotle G. Kalivretenos, David Parker, Edwin E. Ullman and Alexandre V. Nikolaitchik, US Patent # 6,344,360, February 5, 2002.
- "Detection of glucose in solutions also containing an alpha-hydroxy acid or a beta-diketone" George Y. Daniloff, Aristotle G. Kalivretenos, and Alexandre V. Nikolaitchik, US Patent # 6,800,451, October 5, 2004.
- "Detection of glucose in solutions also containing an alpha-hydroxy acid or a beta-diketone" George Y. Daniloff, Aristotle G. Kalivretenos, and Alexandre V. Nikolaitchik, US Patent # 7,078,554, July 18, 2006.
- "Amine detection method and materials" Aristotle G. Kalivretenos, US Patent # 7,229,835, June 12, 2007.
- "Amine detection method and materials" Aristotle G. Kalivretenos, International Application # PCT/US02/34124, filed October 25, 2002.
- "Amine detection method and materials" Aristotle G. Kalivretenos, US Published Application # 20040266016, Notice of Allowance June 2009.

PUBLICATIONS: (16 in print)

Articles

- "Elemental Carbon and Lead Content of Fine Particles from American and French Cities of Comparable Size and Industry, 1985." Delumyea, R. Del; Kalivretenos, A. *Atmospheric Environment* 1987, 21, 1643-1647.
- "Determination of the Fe²⁺/Fe³⁺ Ratio in Nuclear Waste Glass" Hawkes, A.E.; Brewer, K.M.; Brock, N.A.; Hunter, T.R.; Edge, M.; Kalivretenos, A.; Fanning, J.C. *Journal of the American Ceramic Society* 1989, 72, 943-947.
- "Synthesis of β -Resorcylic Macrolides via Organopalladium Chemistry. Application to the Total Synthesis of (*S*)-Zearalenone" Kalivretenos, A. G.; Stille, J. K.; Hegedus, L. S. *J. Org. Chem.*

1991, 56, 2883-2894.

- "Synthesis of Novel and Photolabile Philanthotoxin analogs" Choi, S.-K.; Goodnow, R.; Kalivretenos, A.; Chiles, G. W.; Fushiya, S.; Nakanishi, K. *Tetrahedron* 1992, 48, 4793-4822.
- "Synthesis of Philanthotoxin Analogs with a Branched Polyamine Moiety" Kalivretenos, A.; Nakanishi, K. *J. Org. Chem.* 1993, 58, 6596.
- "Bioorganic studies of transmitter receptors with philanthotoxin analogs" Nakanishi, K.; Choi, S.-K.; Hwang, D.; Lerro, K.; Orlando, M.; Kalivretenos, A.G.; Eldefrawi, A.; Eldefrawi, M.; Usherwood, P.N.R. *Pure & Appl. Chem.* 1994 66, 671.
- "Labeling Studies of photolabile philanthotoxins with nicotinic acetylcholine receptors: mode of interaction between toxin and receptor" Choi, S.-K.; Kalivretenos, A.G.; Usherwood, P.N.R.; Nakanishi, K. *Chemistry & Biology* 1995, 2, 23.
- "Lactams as Heterodienophiles in Diels-Alder Chemistry" Degnan, A.P.; Kim, C.S.; Stout, C.W.; Kalivretenos, A.G. *J. Org. Chem.* 1995, 60, 7724.
- "Synthesis of Medium Ring Lactams Via Cyclization Reactions Using Polymer Bound HOBt as Catalyst" Huang, W., Kalivretenos, A.G. *Tetrahedron Lett.* 1995, 36(50), 9113.
- "Tetrameric Peptide Bundles Via A Highly Convergent Synthesis" Hirsch, J.; Huang, W.; Kalivretenos, A.G. *Biopolymers* 1996, 39, 761-763.
- "Synthesis of N-Hydroxysuccinimide Esters Using Polymer Bound HOBt" Dendrinis, K.; Kalivretenos, A. G. *Tetrahedron Lett.*, 1998, 39, 1321-1324.
- "HOBt immobilized on macroporous polystyrene beads: a useful reagent for the synthesis of amides" Dendrinis, K.G.; Jeong, J.; Huang, W.; Kalivretenos *Chem. Commun.*, 1998, 499-500.
- "Convenient Protection of Amines as Carbamates Using Polymer Bound HOBt" Dendrinis, K.; Kalivretenos, A. G. *Perkins Trans. I.* 1998, 1463-1464.
- "Synthesis and Separation of Hydrophobic Peptides for Use in Biomimetic Ion Channels" Kassim, S.Y.; Restrepo, I.M.; Kalivretenos, A.G., *J. Chromatogr. A*, 1998 816, 11-20.

Chapters in Books

- "Synthetic and Bioorganic Studies with Philanthotoxin Analogs" Nakanishi, K.; Goodnow, R.; Kalivretenos, A.; Choi, S.-K.; Fushiya, S.; Chiles, G.; Eldefrawi, A.; Eldefrawi, M.; Usherwood, P. "New Leads and Targets in Drug Research", *Alfred Benzon Symp.* 33, Krogsgaard-Larsen, P.; Br  gger Christensen, S.; Kofod, H., eds., Munksgaard, Copenhagen, 1992, 138-148.
- "Philanthotoxin-433 and analogs, noncompetitive antagonists of glutamate and nicotinic acetylcholine receptors" Chiles, G.; Choi, S.-K.; Eldefrawi, A.; Eldefrawi, M.; Fushiya, S.; Goodnow, Jr., R.; Kalivretenos, A.; Nakanishi, K.; Usherwood, P. In *Neurotox '91: Molecular Basis of Drug and Pesticide Action*" Duce, I.R., ed., Elsevier Applied Science, London, 1992, 3-17.

PRESENTATIONS: (14 invited, 18 contributed)

Invited Papers

- "Bioorganic Studies of Philanthotoxin Analogs", Synaptic Corporation, Paramus, New Jersey, July, 1992.
- "Total Synthesis of (S)-Zearalenone; Bioorganic Studies of Philanthotoxin Analogues", Dept. of Chemistry and Biochemistry, UMBC, November, 1992.
- "Approaches to the Study of Ion Transport Across Excitable Membranes Through the Use of Ion Channel Models", Scios Nova Inc., Dundalk, Maryland, February 1994.
- "Ion Channels: From Biology to Biosensors" Dept. of Chemistry and Biochemistry, UMBC, November 21, 1994.
- "Biomimetic Ion Channels: Design, Synthesis and Function" Department of Biological

Chemistry, UMAB, Baltimore, MD, February 5, 1996.

- "Biomimetic Ion Channels: Design, Synthesis and Function" Department of Chemistry, Western Maryland College, Westminster, MD, February 9, 1996.
- "Biomimetic Ion Channels: Design, Synthesis and Function" Department of Biology, UMBC, Baltimore, MD, March 13, 1996.
- "Biomimetic Ion Channels: Design, Synthesis and Function" Transcell Technologies, Inc., Monmouth Junction, NJ, May 23, 1996.
- "Biomimetic Ion Channels: Design, Synthesis and Function" Department of Chemistry and Biochemistry, UMCP, April 8, 1997.
- "Synthesis and Separation of Hydrophobic Peptides for use in Biomimetic Ion Channels" Washington Chromatography Discussion Group, Gaithersburg, MD, May 15, 1997.
- "Biomimetic Ion Channels: Design, Synthesis and Function" Department of Chemistry, Catholic University, Washington, D.C., October 3, 1997.
- "Biomimetic Ion Channels: Design, Synthesis and Function" Department of Chemistry, Georgetown University, Washington, D.C., November 5, 1997.
- "Synthetic and Bioorganic Studies of Ion Channels" Insect Chemical Ecology Laboratory, USDA, Beltsville, MD, February 11, 1998.
- "Synthetic and Bio-organic Studies of Ion Channels" CombiChem, Inc., San Diego, CA, June 19, 1998.

Contributed Papers

- "Synthesis of β -Resorcylic Macrolides *via* Organopalladium Chemistry. Application to the Total Synthesis of (S)-Zearalenone", 198th American Chemical Society National Meeting, Division of Organic Chemistry, September, 1989.
- "Synthesis of Medium Ring Lactams *via* Cyclization Reactions Using a Polymer-Supported 1-Hydroxybenzotriazole Catalyst" Wei Huang and Aristotle G. Kalivretenos, Sixteenth Annual Graduate Student Research Day, UMBC, May 4, 1994.
- "Synthesis of Medium Ring Lactams *via* Cyclization Reactions Using a Polymer-Supported 1-Hydroxybenzotriazole Catalyst" Wei Huang and Aristotle G. Kalivretenos, 28th Middle Atlantic Regional Meeting of the American Chemical Society, UMBC, Baltimore, MD, May 25-27, 1994.
- "Heteroatom Diels-Alder Reactions Involving the Amide Carbonyl Group as the Dienophile" Aristotle G. Kalivretenos and Charles W. Stout, 28th Middle Atlantic Regional Meeting of the American Chemical Society, UMBC, Baltimore, MD, May 25-27, 1994.
- "Lactams as Hetero-Dienophiles in Diels-Alder Chemistry" Degnan, A.P., Kim, C.S., Stout, C.W. and Kalivretenos, A.G., 209th Annual American Chemical Society National Meeting, Anaheim, CA, April 2-6, 1995.
- "Synthetic Glutamate Receptor Protein Ion Channel Models" Kadavil, J.A., Maranto, A. and Kalivretenos, A.G., 1st Annual Joint Biochemistry Symposium on Molecular Recognition, UMBC, Baltimore, MD, May 25-26, 1995.
- "Glutamate Receptor Ion Channel Models" Kadavil, J.A., Maranto, A.R., Lin, T.K. and Kalivretenos, A.G., 211th Annual American Chemical Society National Meeting, New Orleans, LA, March 24-28, 1996.
- "Four-Helix Peptide Bundles *Via* a Highly Convergent Synthesis" Hirsch, J., Huang, W. and Kalivretenos, A.G., 211th Annual American Chemical Society National Meeting, New Orleans, LA, March 24-28, 1996.
- "Four-Helix Peptide Bundles *Via* a Highly Convergent Synthesis" Hirsch, J., Huang, W. and Kalivretenos, A.G., International Conference on Protein Folding and Design, NIH, Bethesda, MD, April 23-26, 1996.
- "Lactams as Hetero-Dienophiles in Diels-Alder Chemistry" Douglas Wilkinson, Kleanthis

- Dendrinis and Aristotle G. Kalivretenos, Sixteenth Annual Graduate Student Research Day, UMBC, May 1, 1996.
- "Ion Channels Formed from Rat Connexin 32 Peptides Reconstituted into Lipid Bilayers" Kassim, S. and Kalivretenos, A.G., 213th Annual American Chemical Society National Meeting, San Francisco, CA, April 13-17, 1997.
 - "Experimental Synthesis of Amide Combinatorial Libraries" Jeannie H. Jeong and Aristotle G. Kalivretenos, Ronald E. McNair Scholars Program Fifth Annual Research Conference, UMBC, September 20, 1997.
 - "Synthesis and Separation of Hydrophobic Peptides for use in Biomimetic Ion Channels" 17th International Symposium on the Separation of Proteins, Peptides and Polynucleotides, Rockville, MD, October 26-29, 1997.
 - "Experimental Synthesis of Amide Combinatorial Libraries" Jeannie H. Jeong and Aristotle G. Kalivretenos, Sixth Annual National Ronald E. McNair Student Research Conference, Delavan, WI, November 8, 1997.
 - "Experimental Synthesis of Combinatorial Amide Libraries Using Polymer-Bound Hydroxybenzotriazole (HOBt polymer)" Jeannie H. Jeong and Aristotle G. Kalivretenos, 215th Annual American Chemical Society National Meeting, Dallas, TX, March 29 - April 2, 1998.
 - "Biomimetic Ion Channels Formed From Rat Connexin 32 M3 Domain Peptides" Rebecca M. Meier, Aristotle G. Kalivretenos and Iliana M. Restrepo, 215th Annual American Chemical Society National Meeting, Dallas, TX, March 29 - April 2, 1998.
 - "Off-Line Solid-Phase Derivatization of Biogenic Amines Using Polymer-Supported 1-Hydroxybenzotriazole" William R. LaCourse, Roujian Zhang, Jason Petroski, Aristotle G. Kalivretenos, ACS Pittcon '99, Orlando, FL, March 7-12, 1999.
 - "An Implantable, Wireless Glucose Sensor Providing Continuous Monitoring" Barrett, J., Colvin, A.E., Czarnik, A.W., Kalivretenos, A.G., Lorenz, C.R., Lesho, J.C., Lynn, W.R., Nikolaitchik, A.V., Schneebaum, M.R., Van Houten, K.A., Wahi, M.S. and Zerwekh, P.S., Diabetes Technology and Therapeutics Meeting, Atlanta, GA, October, 2002.